Influence of S-nitrosylation on Myb30 transcription factor from Arabidopsis thaliana

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MYB proteins constitute an important family of transcription factors with regulatory functions in development and defense responses. Members of this family are proteins MYB2 and MYB30 from Arabidopsis thaliana. AtMYB30 is involved in a form of programmed cell death (hypersensitive response, HR) occurring in a limited area at the site of infection as a defense response in plants. This response is accompanied by isolation of the pathogen at the inoculation site and the activation of defense mechanisms in neighboring cells. Furthermore it has been shown that nitric oxide (NO) modulates these processes of cell signaling and may regulate the binding of MYB proteins to DNA. We have previously demonstrated that AtMYB2, is modulated by NO modification of a specific cysteine residue. Using electrophoretic mobility shift assay (EMSA) we now demonstrate that AtMYB30 is also regulated by S-nitrosylation, preventing the binding of this protein to DNA. We identified the specific S-nitrosylated cysteines through site-directed mutagenesis in three cysteine residues and biotin-switch experiments. Finally, we confirmed the S-nitrosylation of AtMYB30 and AtMYB2 by MALDI-TOF mass spectrometry.

Keywords: MYB proteins, S-nitrosylation, Biotin-switch, Mass Spectrometry

Supported by: FAPESC, MCTI, CNPq and CAPES.
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